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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/595,159	02/20/2007	Georg Bachmaier	03869.105608	3530

86528 7590 11/12/2010

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EXAMINER	
ROST, ANDREW J	

ART UNIT	PAPER NUMBER
3753	

NOTIFICATION DATE	DELIVERY MODE
11/12/2010	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/595,159	BACHMAIER ET AL.	
	Examiner	Art Unit	
	Andrew J. Rost	3753	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *20 August 2010*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4,6-18 and 20* is/are rejected.

7)☒ Claim(s) *5 and 19* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *20 August 2010* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. This action is in response to the amendment filed 8/20/2010. Claims 1 and 17 are currently amended. No claims are newly added. No claims are canceled. Presently, claims 1-20 are pending.

Response to Arguments

2. Applicant's arguments with respect to claims 1-4, 6-18 and 20 have been considered but are moot in view of the new ground(s) of rejection. It is considered that the newly applied reference to Trachte (4,725,002) addresses applicants' concerns and claim language relating to the newly added metering device having an actuator with a first end cap that engages a sealing element to open the valve features.

3. Since new grounds of rejection were necessitated by applicants' amendment, the instant Office action is made final.

Drawings

4. The drawings were received on 8/20/2010. These drawings are acceptable.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

7. Claims 1, 2, 4 and 6-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Benson (3,418,980) in view of Nickells (2,922,614) further in view of Trachte (4,725,002).

Regarding claim 1, Benson discloses a valve assembly having an actuator unit comprising a housing (24) with an actuator (30) in the housing, a first end of the actuator having a first end cap (38), a stop (portion of the housing 24 on which the upper surface of the first end cap contacts in figure 2) arranged as a seat on the housing (24) wherein the stop maintains a distance between a sealing element (50) of a valve unit (lower portion of the housing that surrounds the sealing element 48) and the first end cap with the distance being smaller than the stroke distance effected by the actuator. Benson does not disclose the use of a hydraulic compensation element. However, Nickells teaches the use of a hydraulic compensation element that is filled with a fluid (oil) and is connected to an actuator (solenoid element having coil 11) in

order to dampen the movement of the actuator to reduce noise and provide hammer action for the valve (col. 1, lines 21-26). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the actuator of Benson with a hydraulic compensation element as taught by Nickells in order to dampen the movement of the actuator to reduce noise of the actuator. Benson does not disclose the first end cap to engage with the sealing element to open the valve. However, Trachte teaches a metering valve assembly having a piezoelectric cylinder (21) having a first end cap (29) formed with a central recess (30) for receiving a transmission bolt (31) (therefore, it is considered that the transmission bolt is part of the end cap) wherein the transmission bolt is guided against a bulged out end portion (152) of the valve sealing element (15) in order to transfer the changes in length of the piezoelectric control member directly to the valve element and which maintains the advantage of neutralizing slow changes due to temperature, wear and manufacturing tolerances to obtain a high accuracy and reliable reproducibility of strokes of the valve needle (col. 2, lines 17-24). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the first end cap of the Benson reference with a projection (transmission member) as taught by Trachte so that the first end cap can engage the sealing element in order to provide a direct transfer of the changes in length of the piezoelectric actuator to the sealing element in order to obtain a high accuracy and reliable reproducibility of the strokes of the sealing element such that each movement of the first end cap by the actuator operates the sealing element.

In regards to claim 2, Trachte teaches the attachment of a plunger (transmission element 31) to the first end cap that points towards the valve unit.

In regards to claim 4, Benson discloses the stop is embodied as a taper on the internal diameter of the housing (figure 2).

In regards to claim 6, the modified Benson reference discloses the actuator to have a second end cap (34) which is connected to the hydraulic compensation element (Nickells teaches the hydraulic compensation element is connected to a second end of the actuator at the bellows 39).

In regards to claim 7, the Benson reference discloses the second end cap (34) is connected to leads (20, 17) and has an opening.

In regards to claim 8, Benson discloses the actuator is pre-tensioned by a tubular spring (rubber sleeve 32).

In regards to claim 9, Nickells teaches the hydraulic compensation element is rigid in relation to forces applied for short periods (the fluid provides a dampening of the movement of the actuator; col. 1, lines 21-26) but gives way when the actuator is actuated.

In regards to claim 10, Nickells teaches the hydraulic compensation element has at least one hydraulic chamber (chamber defined between the shaft 24 and the plate having openings 37 and 40), a housing (defined by the elements 16 and the plate having openings 37 and 40), a piston (24) which can be pushed into the housing and a storage volume (defined by the bellows 39) which are sealed externally by means of a

membrane (bellows 39) wherein the housing is connected to a second end of the actuator (figure).

In regards to claim 11, Nickells teaches the hydraulic compensation chamber features a number of hydraulic chambers (a chamber is defined between the shaft 24 and the plate having openings 37 and 40).

In regards to claim 12, Nickells teaches the hydraulic chambers are embodied between axially pressure surfaces of the housing (defined by the elements 16 and the plate having openings 37 and 40) and the piston (24).

In regards to claim 13, Nickells teaches the housing comprises axial holes (37, 40) which connect the storage volumes (defined within the bellows 39) with the hydraulic compensation chambers.

In regards to claim 14, Nickells teaches the hydraulic compensation element of the piston (24) and the housing each comprise different coefficients of thermal expansion (the different elements have different thicknesses and surfaces areas).

In regards to claim 15, Nickells teaches the hydraulic compensation element is provided with an equalization store (defined within the bellows 39).

Regarding claim 16, the modified Benson reference discloses a method of operation and/or manufacture wherein a first end cap (38 in Benson) is moved pasted a stop (tapered portion formed in the housing 24) such that with movement of the end cap toward the hydraulic compensation chamber (as taught by Nickells), the first end cap hits the stop and the movement is blocked.

8. Claims 3, 17, 18 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Benson (3,418,980) in view of Nickells (2,922,614) in view of Trachte (4,725,002) and further in view of Lorraine et al. (2002/0139863).

Regarding claims 3 and 17, Benson discloses a valve assembly having an actuator unit comprising a housing (24) with an actuator (30) in the housing, a first end of the actuator having a frustoconical first end cap (38), a stop (portion of the housing 24 on which the upper surface of the first end cap contacts in figure 2) arranged as a seat on the housing (24) wherein the stop maintains a distance between a sealing element (48) of a valve unit (lower portion of the housing that surrounds the sealing element 48) and the first end cap with the distance being smaller than the stroke distance effected by the actuator. Benson does not disclose the use of a hydraulic compensation element. However, Nickells teaches the use of a hydraulic compensation element that is filled with a fluid (oil) and is connected to an actuator (solenoid element having coil 11) in order to dampen the movement of the actuator to reduce noise and provide hammer action for the valve (col. 1, lines 21-26). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the actuator of Benson with a hydraulic compensation element as taught by Nickells in order to dampen the movement of the actuator to reduce noise of the actuator. Benson does not disclose the first end cap to engage with the sealing element to open the valve. However, Trachte teaches a metering valve assembly having a piezoelectric cylinder (21) having a first end cap (29) formed with a central recess (30) for receiving a transmission bolt (31) (therefore, it is considered that the transmission bolt is part of the

end cap) wherein the transmission bolt is guided against a bulged out end portion (152) of the valve sealing element (15) in order to transfer the changes in length of the piezoelectric control member directly to the valve element and which maintains the advantage of neutralizing slow changes due to temperature, wear and manufacturing tolerances to obtain a high accuracy and reliable reproducibility of strokes of the valve needle (col. 2, lines 17-24). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the first end cap of the Benson reference with a projection (transmission member) as taught by Trachte so that the first end cap can engage the sealing element in order to provide a direct transfer of the changes in length of the piezoelectric actuator to the sealing element in order to obtain a high accuracy and reliable reproducibility of the strokes of the sealing element such that each movement of the first end cap by the actuator operates the sealing element. Benson does not disclose the first end cap to have its lateral surface featuring steps. However, Lorraine et al. teach a first end cap (44) to have steps on its lateral surface (the steps support the sleeve 110 and the guide member shown in figure 1). Therefore, it would have been an obvious matter of design choice to make the different portions of the first end cap of Benson as of whatever form or shape (lateral steps) was desired or expedient. A change in form or shape is generally recognized as being within the level of ordinary skill in the art, absent any showing of unexpected results. *In re Dailey et al.*, 149 USPQ 47.

In regards to claim 18, Benson discloses the stop is embodied as a taper on the internal diameter of the housing (figure 2).

In regards to claim 20, the modified Benson reference discloses the actuator to have a second end cap (34) which is connected to the hydraulic compensation element (Nickells teaches the hydraulic compensation element is connected to a second end of the actuator at the bellows 39).

Allowable Subject Matter

9. Claims 5 and 19 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

10. The following is a statement of reasons for the indication of allowable subject matter: the prior art of record does not disclose the first end cap featuring two ears on a trans-axial plane of which the end cap has an external dimension which is greater than the minimum internal dimension of the stop in combination with the other claim limitations.

Conclusion

11. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within

TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andrew J. Rost whose telephone number is 571-272-2711. The examiner can normally be reached on 7:00 - 4:30 M-Th and 7:00 - 12:00 Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Hepperle can be reached on 571-272-4913. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/A. J. R./
Examiner, Art Unit 3753

/John K. Fristoe Jr./
Primary Examiner, Art Unit 3753